SERENITY TERRACE (PWSNO 1400038)
SOURCE WATER ASSESSMENT REPORT

December 3, 2001

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for Serenity Terrace* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Serenity Terrace drinking water system consists of a single well drawing water from a portion of the Coeur d'Alene River/ Silver Valley aquifer system. This part of the aquifer is semi-confined Belt Series bedrock. The well is reported to be only 25 feet deep and is located in the 100-year flood plain of the Coeur d'Alene River. A susceptibility analysis conducted by DEQ October 30, 2000 ranked the well at high risk for microbial contamination and at moderate risk for inorganic, volatile organic and synthetic organic chemical contamination.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Source water protection for Serenity Terrace should begin with bringing the well into compliance with IDAPA standards for wells located in areas subject to flooding. It is necessary to determine whether the well is drawing ground water under direct influence of surface water (GWUDI). An abandoned dug well, mentioned in the April 8, 1999 Sanitary Survey of the system, is within the legally required sanitary setback zone and should be sealed according to Idaho Department of Water Resources standards. If not sealed properly, the abandoned well will remain a significant potential contaminant source because it provides a pathway from the surface to the ground water. The next line of defense is to provide an adequate well house and a fenced well lot to protect the well from livestock and wildlife. Agreements with land owners in the time of travel zones further from the well should be pursued to regulate septic system density, grazing, and storage of large amounts of regulated materials. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies, please contact your regional Idaho Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR SERENITY TERRACE

Section 1. Introduction - Basis for Assessment

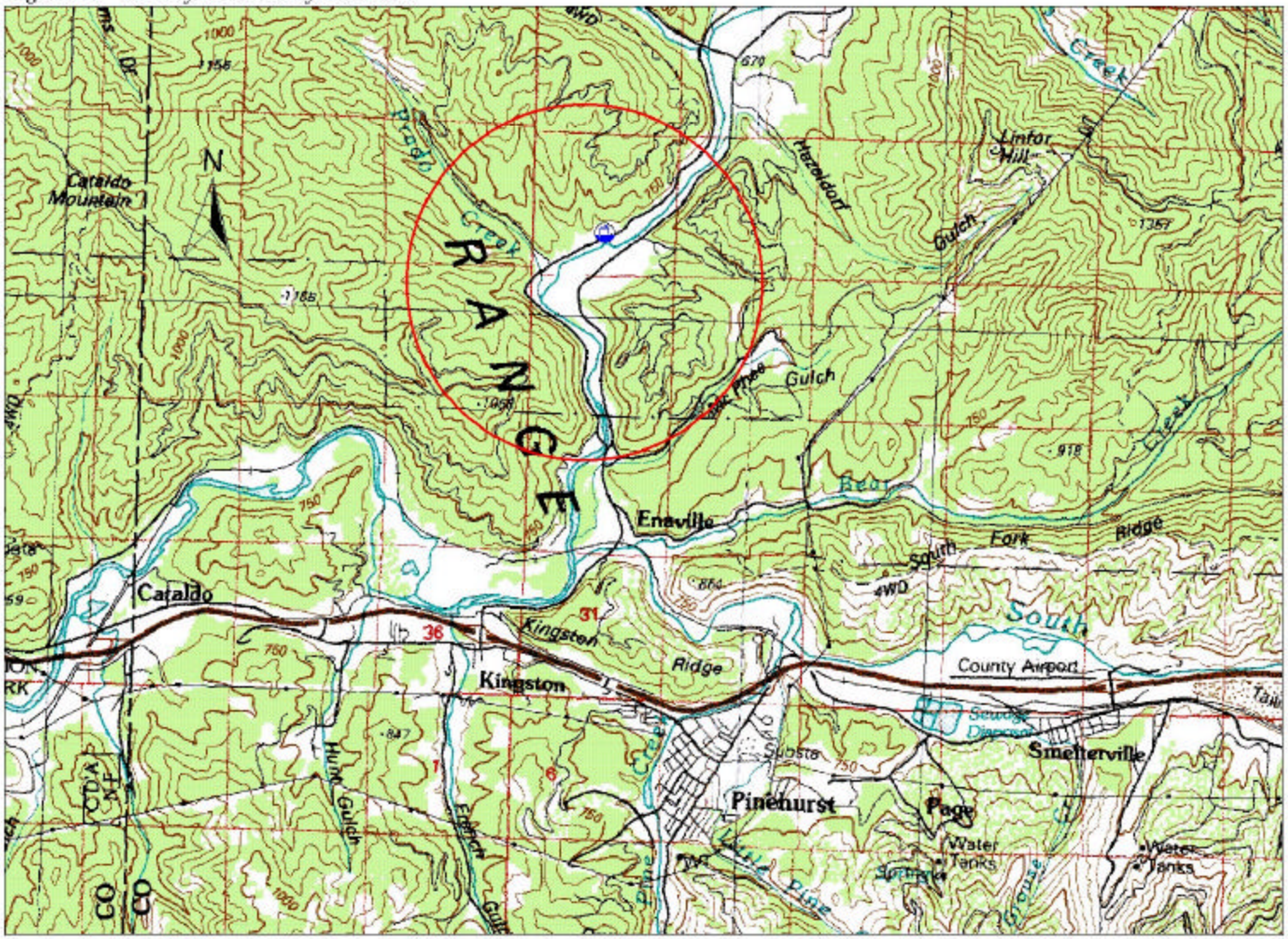
The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings, used to develop this assessment, is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Vicinity of Serenity Terrace.



Section 2. Conducting the Assessment

General Description of the Source Water Quality

Serenity Terrace water system serves a community of about 26 people, located in a rural mobile home park on the Old River Road about 2.5 miles north of Enaville, Idaho. (Figure 1). A 25-foot deep well drawing water from a semi confined Belt Series bedrock aquifer that is part of the Coeur d'Alene River/Silver Valley aquifer system supplies public drinking water for Serenity Terrace.

The primary water quality issue currently facing Serenity Terrace is that of microbial contamination. Total coliform bacteria were present in one sample tested in August 1996; in one sample tested in May 1997; in 10 samples tested in February and March 1998, in one sample tested in June 1998, in two samples tested in April 1999 and one sample tested in December 1999. While some of the positive results may have been due to faulty sampling technique or related to problems with the distribution system, total coliform bacteria were present in the December 1999 sample from the well tap. A water sample tested in December 1999 had concentrations of barium (MCL = 2.0 mg/l) at 0.03 mg/l and nitrate (MCL = 10 mg/l) at 0.70 mg/l. Radionuclides below the Maximum Contaminant Level were detected in the water in 1996.

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the three-year, six-year and ten-year time-of-travel (TOT) for water associated with the Coeur d'Alene River/ Silver Valley hydrologic unit in the vicinity of Serenity Terrace. The computer model used site-specific data assimilated by DEQ from a variety of sources including local well logs. The delineated source water assessment area for Serenity Terrace is roughly circular and encompasses about 149 acres of the Coeur d'Alene River valley and the hillside above the trailer park (Figure 2). The data used by DEQ in determining the source water assessment delineation areas are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use in the Serenity Terrace source water area is privately owned rural residential. Homes in the area are served by septic systems. There is a septic drainfield about 400 feet north east of the well and a community drainfield for the park on the hillside about 900 feet north west of the well. The Coeur d'Alene River crosses all three of the source water delineation time of travel zones. The well head and about half of the delineated areas lie within the 100-year floodplain.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

DEQ conducted a two-phased contaminant inventory of the study area. The first phase involved identifying and documenting potential contaminant sources within the Serenity Terrace Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ. Sanitary Surveys for the system were also consulted. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Mr. Thom Lane.

A total of three potential contaminant sites are located within the delineated source water areas. Table 1 lists the potential contaminants of concern, time of travel zones, and information source.

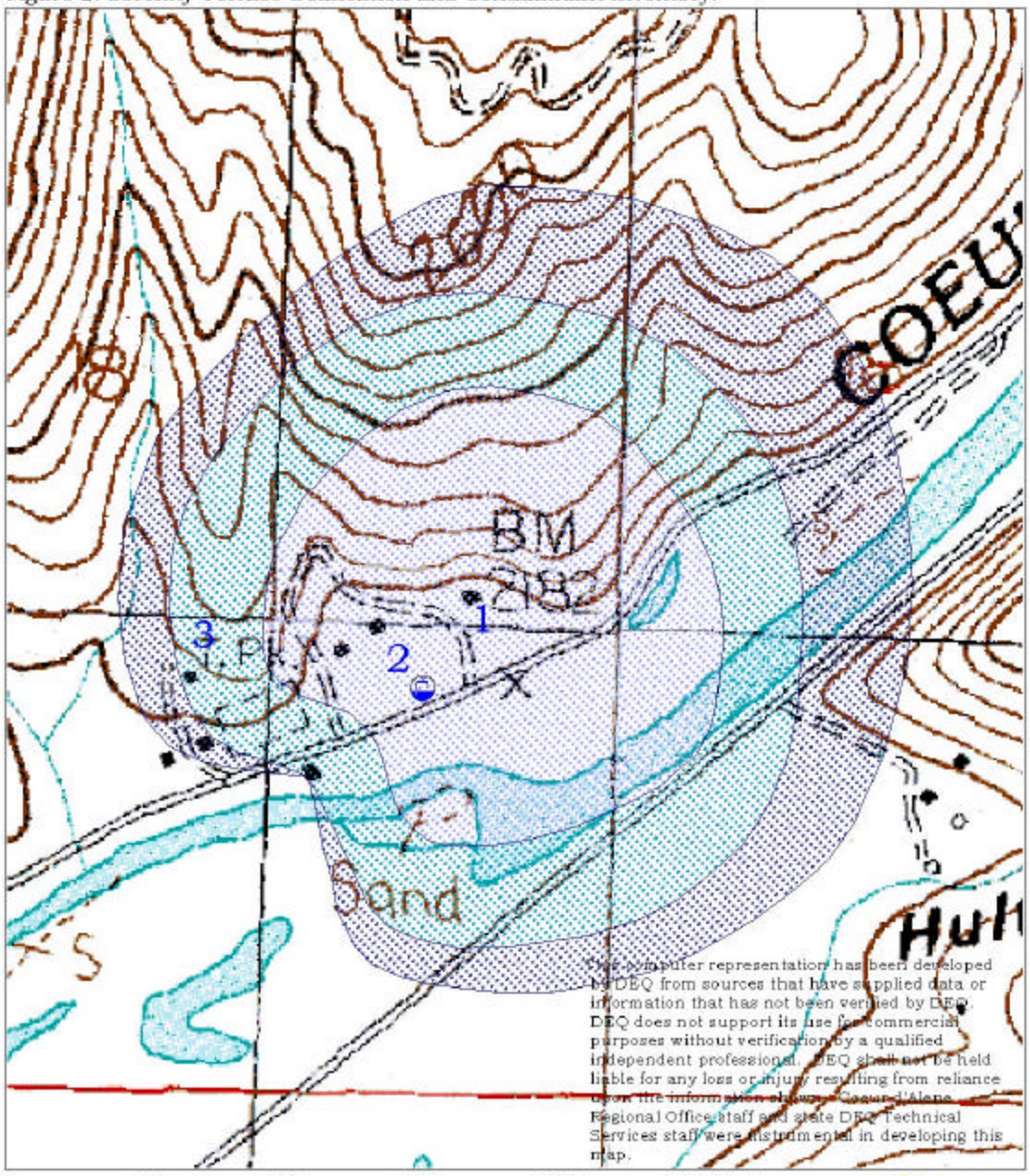
Table 1. Serenity Terrace Potential Contaminant Inventory

SITE #	Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
1	Septic Drainfield	3 YR	Enhanced Inventory	IOC, Microbial
2	Abandoned Well	Sanitary Setback	Sanitary Survey	Microbial
3	Sewage Treatment Facility	6-10 YR	Enhanced Inventory	IOC, Microbial

[1] TOT = time of travel (in years) for a potential contaminant to reach the wellhead

[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Figure 2. Serenity Terrace Delineation and Contaminant Inventory.



Section 3. Susceptibility Analyses

The susceptibility of the source to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity for the well at Serenity Terrace is high. This reflects the shallow depth of the well, 25 feet, and the unconfined nature of the aquifer. Composition of the vadose zone is unknown because a well log is not on file.

Well Construction

Construction details directly affect the ability of wells to protect the aquifer from contaminants. Lower scores imply a system that can better protect the water. The Serenity Terrace well got a high system construction score because it does not meet IDWR standards, it is located in the 100 year flood plain for the Coeur d'Alene River, it is not protected from flooding and it is shallow. Because no well log is on file with DEQ, information about the casing depth and surface seal is missing. A GWUDI analysis for the source needs to be done.

Potential Contaminant Source and Land Use

The well is highly susceptible to microbial contamination based on water sampling history, and the presence of an improperly abandoned well in the Sanitary Setback zone. Potential contaminant source/Land Use scores are low. A community drainfield for the park and a private septic system are located in the source water protection area. Residential development is low density and the land is not in an agricultural area.

Final Susceptibility Ranking

In terms of the total susceptibility score, the well is ranked highly susceptible to microbial contamination and moderately susceptible to the inorganic, volatile organic and synthetic organic classes of chemical contaminants. System construction and hydrologic sensitivity scores added more points to the final ranking than contaminant inventory/land use factors. The susceptibility analysis is summarized on Table 2. The scoring worksheet is included in attachments to this report.

Table 2. Summary of Serenity Terrace Susceptibility Evaluation

Susceptibility Scores[1]										
Well	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1	H	L	L	L	H	H	M	M	M	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
[2]H* - Indicates source automatically scored as high susceptibility due to presence of total coliform bacteria or of an IOC, VOC, or SOC above the MCL in the tested drinking water, or the presence of a significant contaminant source within Zone 1A.

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For Serenity Terrace, source water protection activities should focus first on bringing the well into compliance with statutory provisions designed to prevent contamination of ground water. The abandoned well in the Sanitary Setback Zone need to be sealed in accordance with Idaho Department of Water Resources standards to prevent migration of surface contaminants to the groundwater. The system needs to establish a fenced well lot to protect the area immediately around the well from livestock, wildlife and use or storage of regulated contaminants. Serenity Terrace needs to perform a groundwater under direct influence of surface water (GWUDI) evaluation, and may need to treat its well water prior to distribution, or should consider drilling a new well that meets current standards and is better protected.

Most of the delineated areas are outside the direct jurisdiction of Serenity Terrace. Partnerships with private landowners and county government to regulate land use in the source water protection zone are an option there. Non regulatory management tools can include public education and information and participation in Idaho Rural Water Association programs. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional IDEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 343-7001 for assistance with wellhead protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Environmental Quality, 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality, 2000. Protecting Drinking Water Sources in Idaho.

Idaho Department of Environmental Quality, 2000. Unpublished Report: *Hydrogeologic Summary for Delineation of Time of Travel Capture Zones for Public Water Sources in the Silver Valley/Coeur d'Alene River Hydrogeologic Province.*

Attachment A

Serenity Terrace Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

> 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name : **SERENITY TERRACE** Source: **WELL #1**

Public Water System Number : **1400038** 1/22/01 10:49 AM

1. System Construction			SCORE			
Drill Date						
Driller Log Available	NO					
Sanitary Survey (if yes, indicate date of last survey)	YES	1999				
Well meets IDWR construction standards	NO		1			
Wellhead and surface seal maintained	NO		1			
Casing and annular seal extend to low permeability unit	NO		2			
Highest production 100 feet below static water level	NO		1			
Well located outside the 100 year flood plain	NO		1			
Total System Construction Score			**6**			
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	YES		0			
Vadose zone composed of gravel, fractured rock or unknown	YES		1			
Depth to first water > 300 feet	NO		1			
Aquitard present with > 50 feet cumulative thickness	NO		2			
Total Hydrologic Score			**4**			
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)			IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, OTHER		0	0	0	0
Farm chemical use high	NO		0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	Improperly Abandoned Well	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A			**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE 1B (3 yr TOT)						
Contaminant sources present (Number of Sources)	YES		1	0	0	1
(Score = # Sources X 2) 8 Points Maximum			2	0	0	2
Sources of Class II or III leacheable contaminants or Microbials	YES		1	0	0	
4 Points Maximum			1	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO		0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land		0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B			**3**	**0**	**0**	**2**
Potential Contaminant / Land Use - ZONE II (6 yr TOT)						
Contaminant Sources Present	NO		0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO		0	0	0	
Land Use Zone II	Less than 25% Agricultural Land		0	0	0	
Potential Contaminant Source / Land Use Score - Zone II			**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE III (10 yr TOT)						
Contaminant Source Present	NO		0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO		0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO		0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III			**0**	**0**	**0**	**0**
Cumulative Potential Contaminant / Land Use			**3**	**0**	**0**	**2**
4. Final Susceptibility Source Score			**11**	**10**	**10**	**H***
5. Final Well Ranking			Moderate	Moderate	Moderate	***Hig**

Due to specific conditions noted in zone 1A (Sanitary Setback) this well has been assigned a HIGH over all susceptibility for Microbial contamination.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.